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# EXPEDITIONS TO THE MIOCENE OF WYOMING AND THE CHALK BEDS OF KANSAS.

By CHARLES H. STERNBERG.

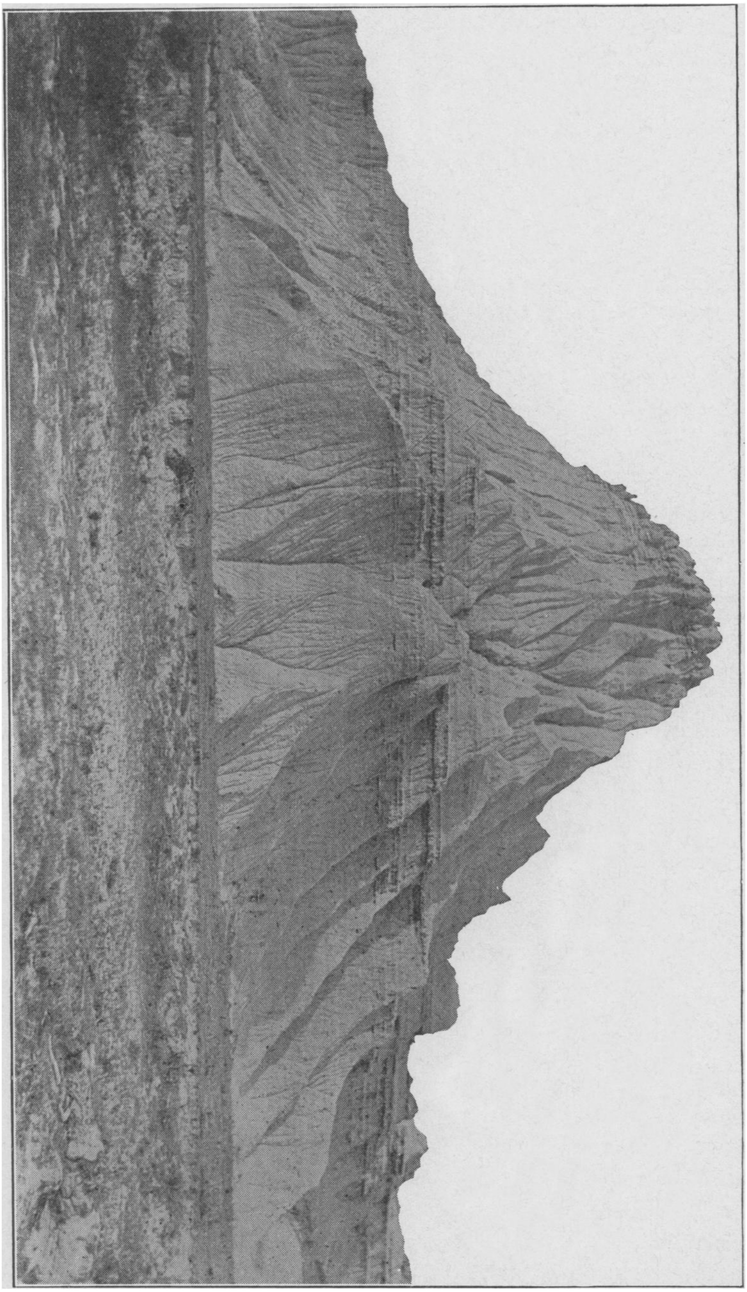
ON July 28 I reached my station at Edgemont, S. D. The next day I drove out to my son Charlie's cabin, thirty-five miles west, on Old Woman creek, in Converse county, Wyoming. I found that, with the assistance of my youngest son, Levi, and Conrad Jesperson, of Lawrence, he had secured a complete series of caudal vertebræ and bones of the pelvis and hind limbs of the great swimming dinosaur *Trachodon;* and three-quarters of a fine skull, six and a half feet long, of *Triceratops*, the huge three-horned lizard of the Laramie. The *Trachodon* material has gone to Munich to complete a composite open mount, I having sent the other material last year. The magnificent skeleton secured last year by my son Charlie went to the Senckenberg Museum. I believe these are the only complete skeletons of American dinosaurs in Europe. The seven-foot skull I discovered last year of *Triceratops*, which I was preparing for the Victoria Memorial Museum, was destroyed last year when the brick walls of the building at 617 Vermont street, in which it was housed, was blown in on top of it by a cyclone—a great loss to science and myself.

Having gone over the Laramie beds thoroughly during the last four years, on the fourth of August we moved over to the old deserted Seaman ranch on Sage creek, a branch of Old Woman creek, in Converse county, Wyoming. These beds are known as the Upper Harrison beds. The first day in this rich field that has been but little explored, I discovered the skeleton of the great titanothere *Brontotherium gigas*. The pelvic arch was partly exposed and measured four feet across the illia; the complete skull; vertebral column, with ribs continuous to first caudal; one humerus, and other bones. The lower limbs were absent. This specimen, according to Doctor Matthew, curator of vertebrate palæontology in the American Museum of Natural History, New York, is the best single specimen known, and is the size of their mounted composite specimen that measures over twelve feet long and about eight feet high. We are now preparing this noble specimen for the Victoria Memorial Museum at Ottawa, Canada, and will secure casts of the feet from the American Museum specimen.

We secured a great many specimens of the oreodont *Merychyus harrisonensis*, including a skeleton, over twenty good skulls, and many fragments of over a hundred individuals. This species, so common in these beds, was about the size of a sheep, with complete dentition. The strong, chisel-shaped incisors were doubtless often used in offense as well as defense. Without doubt he browsed on trees and bushes, and was also omniverous in habit. He was provided with four hoofed toes on each foot, and a dew claw that represented the fifth toe, showing that many of the animals of that day were getting away in foot structure from the five-toed plantigrade mammals of the Eocene. We secured a very fine skull of the hog-like *Elotherium*, and the large bear-like wolf *Amphicyon superbus*, besides jaws and teeth and parts of skulls of two species of three-toed horses, and a couple of species of rhinoceros, etc. Fresh-water and land turtles were very abundant. We secured some twenty-five or more specimens, ranging from five inches to twenty inches in length. *Stylemeys nebrascensis* and *Testudo laticuneus* were the most common.

We must have seen over a hundred broken-up shells over the area of about a quarter section we explored. The Upper Harrison beds present bold faces of tablelands that rise everywhere along the edge of this formation—a prolonged spur of the Pine Ridge of Nebraska. These tablelands and castellated buttes rise above the lower strata of this formation at least 600 feet. Usually, as remarked, the cap sheet, which is of hard clay and sandstone, has weathered into perpendicular walls, while the softer gray, comminuted, shale-like rock disintegrates below into fantastic sculptuary, as specially noted in the beautifully carved and fluted slopes of the butte, of which I show you a photograph (plate). This bold headland of the tableland behind has lost its protecting cap of harder rock, leaving the frost, wind and weather to freely sculpture it into the most beautiful butte I have ever seen in any formation.

The region that yielded the richest returns lay at the heads of two tablelands about a mile apart. I suppose about 600 feet of the Upper Harrison beds are exposed in the canyons and walls of the high tablelands. The strata is a shale-like gray rock that disintegrates easily and exposes the fossils once buried here. The material resembles the deposits of the flood plain of a river, and, to add to this belief, a wide river course crosses the beds and is traced by the washed sand and gravel of the old bed. The river was about a hundred yards wide. So the old theory of great lakes



One of the Nebraska buttes.

during Tertiary time must often give way, as in this locality, to river and flood plain. I noticed, as I walked over the open prairie to the bad-lands I explored, the remains of sheep that had died here and there and left complete skeletons, or a few bones and skull, or a single skull. Birds and coyotes had scattered the remaining parts of the skeletons. And so when I walked into the steep and denuded fossil beds I found as abundantly the remains of the oreodont—a skeleton here, a fragmentary one there; here a skull, there a pile of bones. They had died under similar conditions, perhaps, and lay in death a prey to wolves, etc. When the river overflowed her banks the scattered remains were covered and are preserved to this day, and the weathering of the rock has exposed them to the light of day again, after ages of burial. Now, owing to the efforts of us fossil hunters, we add other pages to Nature's great picture book that tells the story of the past.

My paper, a record of our work in the fossil fields, would not be complete without an account of my son George F. Sternberg's expedition into the rich field of the Niobrara, of western Kansas, which I have cultivated since 1875. This year he had full control, and I was not with him, and gladly give him credit for the best single year's collection we have ever taken out of the chalk. He had as his assistant Mr. Abe Easton, of Quinter, Kan., who proved an able helper. Among the noted specimens is the most complete skeleton so far discovered of the great fish *Portheus molossus*. All the fins were present, for the first time, with the complete skeleton, except the head, which we have been so fortunate to obtain from another individual of the same size. This skeleton lies on its side and is fourteen feet long; the tail fins thirty-one inches long. When this specimen has been described its entire anatomy will be known for the first time, although first described by Professor Cope in 1872. Another fine specimen is the complete hind limbs, with part of the skull, of *Pteranodon ingens*. Doctor Eaton, the authority on pterodactyls at Yale, told me that though they had 500 specimens, this was the first one in which all the bones of the feet were in position. This specimen has gone to the American museum.

Of the wonderful snout fish, or *Protophyrœna*, of the Niobrara, George found a complete set of pectoral fins, with their arches. They measure 3 feet and 9 inches in length and are 10½ inches wide at the base. The enameled edge is as sharp as a knife. In life they stood out at right angles to the body, like the scythes attached to the wheels of the chariot of some ancient war king.

They were rigid when they carved at pleasure the living *Portheii* or mosasaurs. The premaxilæ were prolonged into a long, dagger-like weapon of solid bone, and the teeth in the angles of the jaws were doubl-eedged and projected forward. So when, with the swimming force of this great fish, the snout entered the quivering flesh of his prey, these teeth opened wide the breach, permitting the whole head to enter. If the sharks of modern oceans are their terror, what can we say of the snout fishes of the Cretaceous?

George secured a complete skeleton, nearly, of a large *platecarpus* nineteen feet long, the largest I have known—the entire column, head, and one paddle and ribs of one individual. Also, a splendid little tylosaur—most of the column, head, front and back paddles nearly complete, with breast bone and cartilagenous ribs. We are now mounting these great show specimens at my shop in Lawrence. Charlie is mounting the titanothere at his home on his homstead in Wyoming. George also secured fine skulls, in addition, of *platecarpus* and *tylosaurus* of *Portheus; Icthyodectes*, the great cat fish; *Anogmius*, *Empo*, *Gillicus*, etc. And more wonderful, the tail of a shark showing the dorsal fin for the first time. The shark we sold to the University of Kansas last year, now finely mounted by Mr. Martin, under whose skillful hands a skull was found beneath the scattered fragments that covered it. Thus a specimen of inestimable value of this rare shark is preserved in our University Museum.